

Remarks

Claims 1, 2 and 6-24 have been amended. Reconsideration and allowance of the pending claims are respectfully requested.

Claim Objection

The Final Office Action objected claims 6 and 19 because of incorrect spelling of "kernal" and "comprise". As suggested, Applicant has amended them into "kernel" and "comprises". Withdrawal of the present objection is respectfully requested.

Claims Rejections Under 35 U.S.C. 101

The Final Office Action rejected claims 9-24 under 35 USD 101 due to being directed to non-statutory subject matter.

Claims 9-16

The Final Office Action rejected claim 9 because it recites "virtual machine monitor" which is interpreted software. Applicant has amended the subject matter of claim 9 into a system, and added a hardware "processor" into the claim body. Examples of the "system" may include a computing platform which should be regarded as a statutory subject matter under 35USD 101. Withdrawal of the present rejection is respectfully requested.

Claims 17-24

The Final Office Action rejected claim 17 because the subject matter of claim 24 recites "computer-readable medium" that is not limited to tangible embodiments. Applicant has amended it into a tangible computer readable medium, which would cover tangible embodiments as disclosed in the specification as well as other tangible embodiments that are apparent to a skilled person. Withdrawal of the present rejection is respectfully requested.

Claims Rejections Under 35 U.S.C. 102

The Official Action rejected claims 1-3, 5-11, 13-20 and 22-24 under 35 USC 102(b) as being anticipated by Sugerman et al ("Virtualizing I/O Device on VMware Workstation's Hosted Virtual Machine Monitor"). Applicant respectfully requests reconsideration and withdrawal of the present rejection.

As is well-established, in order to successfully assert a prima facie case of anticipation, the Office Action must provide a single prior art document that includes every element and limitation of the claim or claims being rejected. Therefore, if even one element or limitation is missing from the cited document, the Office Action has not succeeded in making a prima facie case.

Claim 1

Claim 1 recites that "determining....., wherein the device related operation includes an operation inputting/outputting data from/to an input/output device;

and determining **whether virtualization of the device related operation can be handled by a first virtual input/output device installed inside of the kernel component of the virtual machine monitor**, which is unanticipated by Sugerman.

In the response to arguments, Examiner acknowledges that Sugerman teaches the VMM can potentially handle accesses not interacting with the hardware and any accesses interacting with the hardware should be handled by VMAApp. Examiner further acknowledges that the virtual NIC is implemented via a combination of code in the VMM and VMAApp.

However, in the response to arguments Examiner appears to rely on section 2.3, paragraph 3, lines 5-9 for the teaching that the device related operation is passed to the virtual NIC emulation in VMAApp when it is determined that the operation cannot be handled by the virtual NIC emulation in the VMM, which Applicant respectfully objects.

Section 2.3, paragraph 3, lines 5-9 of Sugerman teaches that VMM handles accesses to virtual Lance's address register and VMAApp handles accesses to virtual Lance's address register. Applicant would like to point out that either Lance's address register or Lance's data register is not the Lance. On the contrary, Lance's address register and Lance's data register just make a part of the Lance. Besides them, Lance should include logic(s) to support receiving/sending data via the Lance. It is well-known in the art that Lance is an input/output (I/O) device. However, it is also

well-known in the art that neither address register nor data register is an I/O device, but a part of the I/O device.

Neither access to virtual Lance's address register nor access to virtual Lance's data register can complete virtualization of a device related operation which may include an operation inputting/outputting data from/to an I/O device, e.g., the operation receiving/sending packets to or from the Lance. On the contrary, they are just a part of the virtualization of the device related operation. For example, access to the Lance's address register may only export the MAC address of the Lance. Receiving/sending packets via the Lance needs far more than exporting the MAC address of the Lance. This is actually consistent with the teaching of Sugerman that "virtual NIC itself is implemented via a combination of code in the VMM and the VMApp", "The VMM exports a number of virtual I/O ports and a virtual IRQ" of Section 2.2, paragraph 4, lines 1-3.

Further, in the response to arguments, Examiner appears to rely on section 3.3, paragraph 2, lines 1-8 for the teaching that the device related operation is passed to VMApp when it is determined that VMM cannot handle the operation, which Applicant respectively objected.

Section 3.3, paragraph 2, lines 5-10 teach that VMM can handle emulation of I/O instructions that do not trigger real I/O, such as modifying the state of the Lance data port. Here, the real I/O includes packet transmission via the Lance data port (lines 5-6 and 9-10 of paragraph 2, section 3.3). It should be noted that Sugerman admits

that modifying the state of the Lance data port is not the real I/O. It is well-known in the art that state of a device locates in a configuration file which is stored outside of the device and that it is usually the device driver rather than the device itself to modify of the state of the device. With that said, modifying the state of the Lance data port is not the device related operation of claim 1 which may include an operation of inputting/outputting data to/from an I/O device, and the cited paragraph of Sugerman does not teach that the virtual I/O device inside of VMM can completely handle the virtualization of the device related operation.

In view of the above, Sugerman does not teach "determining....., wherein **the device related operation includes an operation inputting/outputting data from/to an input/output device; and determining whether virtualization of the device related operation can be handled by a first virtual device** installed inside of **the kernel component of the virtual machine monitor**". Therefore, claim 1 of the present application is allowable.

Claim 7

Claim 7 reciting "**passing the device related operation to a second virtual input/output device installed outside of the kernel component of the virtual machine monitor**, in response to determining that the emulation of the device related operation cannot be handled by the first virtual device.", is unanticipated by Sugerman.

The Final Office Action appears to rely on section 2.1, paragraph 2, lines 7-12 for the teaching of the above, which Applicant respectfully objects. The cited paragraph teaches that IN/OUT instructions for all I/O operations are emulated either in the VMM or in the VMApp. As stated in the above with respect to claim 1, not all of I/O operations of Sugerman are the device related operation of claim 1, e.g., modifying the state of the Lance data port is not the device related operation. Further, the device related operation of claim 1 of the present application may include more than one I/O operations of Sugerman, e.g., access Lance's address register and access Lance's data register are just a part of the device related operation.

As taught in section 2.2, paragraph 4, lines 1-2 and section 2.3, paragraph 3, lines 5-9, that the virtualization of inputting/outputting data to/from the NIC is implemented by both of VMM and VMApp, rather than by either VMM or VMApp. Further, Applicant fails to see that Sugerman teaches a virtual input/output device inside of the VMApp handle the device related operation if VMM cannot. For example, Figure 3 appears to illustrate the virtual NIC inside of VMM and the virtual network hub and virtual bridge inside of the VMNet driver rather than the VMApp to complete the virtualization of NIC. Moreover, the virtual network hub and virtual bridge are not the virtual input/output device.

For similar reasons, claims 2-3, 5-6, 8-11, 13-20 and 22-24 are unanticipated by Sugerman. Withdrawal of the present rejection is respectfully requested.

Claims Rejections Under 35 U.S.C. 103(Sugerman/Barham)

The Office Action rejects claims 4, 12 and 21 under 35. U.S.C. 103 as being unpatentable over Sugerman in view of Barham ("Xen and the Art of Virtualization"). Each of claims 4, 12 and 21 include one of claims 1, 9 and 17 as a base claim and are therefore allowable for at least the reasons stated above. Applicant respectfully requests the present rejection of claims 4, 12 and 21 be withdrawn.

Conclusion

The foregoing is submitted as a full and complete response to the Official Action. Applicant submits that the application is in condition for allowance. Reconsideration is requested, and allowance of the pending claims is earnestly solicited.

Should it be determined that an additional fee is due under 37 CFR §§1.16 or 1.17, or any excess fee has been received, please charge that fee or credit the amount of overcharge to deposit account #02-2666. If the Examiner believes that there are any informalities, which can be corrected by an Examiner's amendment, a telephone call to the undersigned at (503) 439-8778 is respectfully solicited.

Respectfully submitted,

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